

REMARKS

The Examiner's Office Action of June 15, 2004 has been received and its contents reviewed. Applicants would like to thank the Examiner for the consideration given to the above-identified application as well as the time provided to conduct a Personal Interview on September 16, 2004. During the productive interview with Examiners L. Nguyen and H. Pham, the current rejections and the prior art documents were discussed in detail.

Claims 15-37 are currently pending for consideration, of which claims 15, 20, 24 and 32 are independent. By the above actions, claims 15-17, 20-22 and 24-37 have been amended. In view of these actions and the following remarks, reconsideration of this application is now requested.

On page 2 of the Office Action, claims 25-31 and claims 33-37 are objected to as improperly depending on cancelled claims. By the foregoing amendment, Applicants have amended the dependent claims to properly depend on non-cancelled claims. Thus, Applicants request withdrawal of the objection.

Also on page 2 of the Office Action, claims 15, 16, 18-21 and 23 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,914,731 to Yano et al. (hereinafter "Yano"), while on page 6 of the Office Action, claims 17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yano in view of U.S. Patent No. 6,142,598 to Iwasaki et al. (hereinafter "Iwasaki"). In view of the amendments to the claims and the comments to follow, this rejection is respectfully traversed in that the patents to Yano and Iwasaki neither disclose nor remotely suggest all features of the presently claimed invention.

As the Examiner can readily appreciate, each of independent claims 15 and 20 recite the use of a random value sequence for generating a driving timing sequence. Specifically, independent claim 15 is directed to a printing apparatus. The apparatus includes a print head for scanning over a printing medium, the print head comprising a printing element set

comprising M printing elements for selectively forming dot images on the printing medium (M is a positive integer). The apparatus also includes a timing device for, in response to a reference timing sequence and a random value series, generating N sets of driving timing sequences. The random value series includes N random values, each of the N sets of driving timing sequences being obtained by shifting the reference timing sequence with a corresponding one of N random values (N is a positive integer). The apparatus also includes a driving device for, in response to said N sets of driving timing sequences, forming the dot images, wherein each set of driving timing sequences sequentially drives the M printing elements to provide random distances between consecutive dot images formed by the printing element set of the printing head.

Independent claim 20 has been amended to recite similar features directed to providing random distances between consecutive images formed by the printing head. Applicants submit that support for these features can be found, for example, in paragraphs [0047] through [0049], as well as Figures 9 and 10 of the present specification.

Turning specifically to claim 15, Applicants submit that Yano does not disclose a driving device for, in response to said N sets of driving timing sequences, forming said dot images, wherein each set of driving timing sequences sequentially drives the M printing elements to provide random distances between consecutive dot images formed by the printing element set of the printing head. Instead, as stressed in the Personal Interview, the random numbers of Yano are for randomly modulating the dot size (col. 17, lines 60-61, Yano et al.) and are irrelevant to driving timing. The teachings of Yano are totally different and remote from that which is presently set forth by Applicants' claimed invention and consequently, the patent to Yano fails to anticipate that of the claimed invention.

Additionally, as discussed in previous responses, the unit for generating random value

series is not disclosed by Yano. The element 1703 of Yano is nothing more than a DRAM for storing random numbers (col. 17, lines 60-62, Yano). Further, the random numbers are calculated in advance and are not generated by the element 1703 in Yano (col. 17, lines 60-62, Yano). Therefore, the unit for generating random value series as set forth in accordance with Applicants' claimed invention is neither disclosed in nor suggested by the teachings of Yano.

Accordingly, Applicants respectfully submit that Yano does not anticipate the claimed invention, since the teachings of Yano do not disclose providing random distances between consecutive dot images formed by the printing element set of the printing head, and Yano does not disclose the unit for generating random value series found in the claimed invention. Moreover, Applicants submit that Iwasaki, used in the rejection of dependent claims 17 and 22, is directed to a printing apparatus that teaches the constant shifting of drive timing as discussed in the previous response and does not solve the deficiencies of Yano. Therefore, it is further respectfully submitted that claims 15-24 are not anticipated nor suggested by the prior art and are allowable over the prior art of record.

With reference to page 3 of the Official Action, claims 24-37 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,142,598 to Iwasaki in view of Japanese Publication No. 07-125311 to Naoji et al. (hereinafter "Naoji"). In view of the amendments to the claims, this rejection is likewise respectfully traversed in that neither Iwasaki nor Naoji provide any teaching deemed to overcome the aforementioned shortcomings associated with the teachings of Yano.

Like independent claims 15 and 20, each of independent claims 24 and 32 recite the use of a random value sequence for generating a driving timing sequence. For example, independent claim 24 is directed to a printing apparatus. The printing apparatus includes a print head for scanning over a printing medium, the print head comprising at least one printing

element. The printing apparatus also includes a timing device for generating a driving timing sequence by shifting a reference timing sequence with a random value and a driving device, in response to said driving timing sequence, for driving said printing element to form an image by printing dots on said printing medium. With the shifting of said reference timing sequence, a cyclic unevenness of said image is scattered and random distances between consecutive dots printed by the at least one printing element of the printing head is provided.

Independent claim 32 has been amended to recite similar aspects regarding providing random distances between consecutive images formed by the printing head. Applicants submit that support for these features can be found, for example, in paragraphs [0047] through [0049], as well as Figures 9 and 10. Applicants respectfully submit that neither Iwasaki nor Naoji teach or suggest all features of the present invention.

Iwasaki is directed to a print apparatus and method in which the print head having printing elements to form print dots is made to scan over a printing medium in a predetermined direction to form a printed image. The drive timing intervals between a plurality of dots formed in the scan direction by the same printing element are changed in a cycle smaller than a cycle in which a printed image variation appears, in order to eliminate the printed image unevenness that cyclically appears due to variations in the manufacturing errors of a rotary drive source and other mechanisms for performing the scanning.

As acknowledged in the Office Action, Iwasaki does not disclose a reference timing sequence is employed with a random value sequence as set forth in the present invention. Moreover, Applicants submit that Iwasaki does not disclose random distances between consecutive dots printed by the at least one printing element of the printing head as now set forth in independent claims 24 and 32.


Applicants respectfully submit that Naoji cannot be seen to solve these noted

deficiencies. As can best be understood, Naoji discloses a multi-pass recording method which prints by writing multiple times to a printing field using a different random mask pattern, as surmised from the machine-translation of the Naoji et al. reference. Applicants further note that Naoji et al. discloses printing by using a different random mask for each printing area and each sort of ink, in a multi-pass recording system. However, Naoji et al. does not teach, disclose, or suggest a timing device, in response to a reference timing sequence and a random value series, for generating a driving timing sequence.

Therefore, in view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, that claims 15-37 be allowed, and that the application be passed to issue.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicants' representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,



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